SPECTRUM SHARING COMMITTEE RELEASE PLAN

Approved by the Spectrum Sharing Committee Steering Group
22 January 2020
Release 1
Commercializing CBRS: Standards and Ecosystem Support

10 WInnForum Standards and Supporting Ecosystem Development

- SAS Test Specification
- CBSD Test Specification
- PAL Database
- PKI
- CPI
- SAS to CBSD Protocol Specification
- SAS to SAS Protocol Specification
- Communications Security
- Operations Security
- Operational and Functional Requirements
- Approved CBSD Testing
- Approved PKI Certificate Authority
- Approved CPI Training Program
- Measurement Database
- Air Interface Database
- CBSD Test Harness
- SAS Test Harness
- Certified SAS
- Certified CBSD
- Certified ESC
- Certified Professional Installer

Results: 4 Key Certifications
Standards That Comprise Release 1

WINNF-TS-0112 Operational and Functional Requirements
WINNF-TS-0065 CBRS Communications Security Technical Specification
WINNF-TS-0071 CBRS Operational Security Technical Specification
WINNF-TS-0016 SAS to CBSD Protocol Specification
WINNF-TS-0096 SAS to SAS Protocol Specification
WINNF-TS-0061 SAS Test and Certification Specification
WINNF-TS-0122 CBSD Test and Certification Specification
WINNF-TS-0245 PAL Database Specification
WINNF-TS-0022 CBRS PKI Certificate Policy
WINNF-TS-0247 CPI Training Program Accreditation Standard
WINNF-SSC-0001 Air Interface and Measurement Policy
WINNF-SSC-0002 Registered Air Interfaces and Measurements
WINNF-SSC-0003 Traceability Matrix
WINNF-SSC-0004 Release Plan (this document)
WINNF-SSC-0005 <withdrawn>
WINNF-SSC-0006 <withdrawn>
WINNF-SSC-0007 Margin Policy
WINNF-SSC-0008 Coordinated Periodic Activities Policy (CPAS)
Standards Milestones

CA Accredited: Q4 2017
Baseline Standards Announced: Q1 2018
CBSD Test Code Released: Q2 2018
CBSD Test Labs Approved: Q2 2018
SAS Test Code Released: Q2 2018
CPI Training Program Accreditation: Q1 2019

For more on CBRS Status, please see https://cbrs.wirelessinnovation.org/cbrs-status-summary
Border Area Management
• Requirements on Implementing international agreements to protect Canada and Mexico

CBSD Measurement Reporting
• Initial requirements for CBSD measurements of their local interference environment and reporting those data back to the SAS.

CBSD Registration Processing
• The requirements for how a CBSD registers with a SAS, including owner registration, professional installer registration and CBSD registration.

Communications Security
• The communications security policies governing SAS and CBSD communications interfaces.

Certificate Authority Accreditation Standard

Certified Professional Installer Training Program Accreditation Standard
• Guidelines for adoption of uniform industry working standards and curriculum required to be consistent with the protection of spectrum, both licensed and GAA, for sharing in the 3550-3700 MHz band.

Note: Detailed feature list associated with each release is captured in the SSC CBRS Requirements Traceability Matrix (WINNF-SSC-0003)
CPE-CBSD Handshake

Domain Proxy
  • The baseline Operational and Functional Requirements of the CBRS Domain Proxy for initial testing and trials.

Dynamic Protection Zones

Environmental Sensing Capability (ESC)
  • The requirements for implementation of an Environment Sensing Capability, and protecting federal incumbents.

Exception Management
  • The requirements for how trouble tickets or exceptions are managed, including from FCC input, reports from incumbents, and reports from PAL.

FSS Protection

Grandfathered Wireless Device Protection

Operations Security
  • The overall system operational security requirements to include handling of incumbent data, obfuscation of spectrum data, and processes associated with auditing and governance of the SAS infrastructure.
PAL Protection Area Definition

- Requirements on how PALs report their coverage area to the SAS for end-to-end use of the licenses. This includes how PAL licensees define PAL Protection Areas (PPAs), request to operate in a particular geographic area within their license boundary (PPA), how PPA credentials and IDs are defined, conveyed and managed, and how the SAS accomplishes such protections.

Protocol Support for Priority Access Licensing

Propagation Modeling

- Identify appropriate 3.5 GHz propagation models for Incumbent and PAL protection and PPA definition, determine relative benefits and limitations, develop agreement on baseline needs such as underlying data, and define standardized interference aggregation methodologies.

SAS to SAS Information Sharing

- Initial support for SAS-SAS Synchronization and Information exchange.

Spectrum Grant Request Processing

- The requirements for how a CBSD requests and relinquish grants, and how grants are reassigned or terminated.
Following the release of revision 1 specifications, change requests will be collected from the Forum’s public issues management portal.
Release 2
There will be a mix of Release 1 and post Release 1 (Release 2, Release 3, etc.) participants in the ecosystem for the foreseeable future

- Note that Release 1 will include FCC changes to Part 96 as they occur

**Release 1 is a default for Devices and SAS’s**

- Assure that all Entities “behave properly” when working in a mixed Release environment (SAS to CBSD, CBSD to SAS, SAS to SAS)
  - Release 2 entities are responsible for working with Release 1 entities
  - Post Release 1 Specs should define default Behavior Appropriately

"Release 2" is not mandatory, but if you chose to move to Release 2, it includes a mandatory protocol update to allow feature discovery/capability exchange (for any Post Rel 1 SAS or CBSD) plus optional features

- Support for multiple release level and feature set operability
- Backward compatible with Release 1 -- Nothing Breaks when talking to Release 1 Entity

**Capability Exchange will Support Selective Implementation of Release 2 Optional Features**

- Devices and SAS’s can determine Release level (Release 1 would just ignore) of “Partner”
- Devices and SAS’s may inquire about Implemented Post Release 1 Features

**Optional Release 2 Features are Severable (Standalone, Built on top of Release 1 if Possible)**

(Most?) Specific Post Release 1 Features are Optional

The Set of Permitted Features is “Open” to Extension by registering a “Feature String” with WInnForum, much like we provide for extending Air Interface and Measurements

- Enable SAS and CBSD extensions and Proprietary features through the same interface
- Might not be Associated with a WInnForum Standard

**Test and Certification of Release 2 to be worked out**

- Certification may be against a specific profile to be defined by the steering group with a specific set of options mandatory for that profile
Notional Spec Tree

- Includes Implementing Protocol
- Testing TBD, based on Traceability Matrix,
- Desire for Feature by Feature and Severable: may have feature dependencies

Rel. 2 Mandatory Discovery Protocols w/ Industry Testing

Rel. 2 Option 1
Rel. 2 Option ...
Rel. 2 Option N

Release 1 w/ FCC Testing (Mandatory)

Optional
Mandatory
The WINnForum “Lean Standards Development Model (LSDM)”

Architecture and Roadmap

Requirements Specification 1  Requirements Specification 2  Requirements Specification 3  Requirements Specification 4  ...

Protocol and API Specification 1  Protocol and API Specification 2  Protocol and API Specification 3  ...

Test and Certification Specification 1  ...

Release 1  Release 2  Release N

Backlog items are assigned to a “sprint”
Continual Feedback from deployment against Interim Releases establishes new backlog items
Major release comprised of one or more interim releases
Results: Standards Based Products deployed in months, not years

Copyright © 2017 Software Defined Radio Forum, Inc. All Rights Reserved
## Current Plan for Release 2 Features and Status (Details in follow on slides)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Requirements (WG1)</th>
<th>Protocols (WG3)</th>
<th>Operations (WG5)</th>
<th>Test (WG4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability Exchange</td>
<td>Complete</td>
<td>In Development</td>
<td>Not Applicable</td>
<td>In Development</td>
</tr>
<tr>
<td>ENHANCED_GROUP_HANDLING</td>
<td>Complete</td>
<td>In Development</td>
<td>Not Applicable</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>PAL Secondary Market Support</td>
<td>Release 1</td>
<td>To Be Determined</td>
<td>In Development</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>PAL Operations (i.e., Channel Mapping)</td>
<td>Release 1</td>
<td>To Be Determined</td>
<td>In Development</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>Support for 1D and 2D Antenna Patterns</td>
<td>Complete</td>
<td>In Development</td>
<td>In Development</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Indoor Penetration Loss</td>
<td>In Development</td>
<td>Introduced, Not Started</td>
<td>To Be Determined</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Enhanced CPE-CBSD Support</td>
<td>In Development</td>
<td>In Development</td>
<td>In Development</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Enhanced Propagation Models</td>
<td>Introduced, Not Started</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Flexible Grant Request</td>
<td>Not Applicable</td>
<td>In Development</td>
<td>Not Applicable</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>GAA Coexistence Support</td>
<td>In Development</td>
<td>In Development</td>
<td>In Development</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Grant Update</td>
<td>To Be Determined</td>
<td>In Development</td>
<td>Not Applicable</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>New Response Codes</td>
<td>Not Applicable</td>
<td>In Development</td>
<td>Not Applicable</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Registration Enhancements</td>
<td>In Development</td>
<td>Introduced, Not Started</td>
<td>To Be Determined</td>
<td>Introduced, Not Started</td>
</tr>
<tr>
<td>Support for beamforming</td>
<td>To Be Determined</td>
<td>To Be Determined</td>
<td>To Be Determined</td>
<td>To Be Determined</td>
</tr>
</tbody>
</table>

**Key**
- Not Applicable
- Introduced, Not Started
- In Development
- Complete

Reminder: Release 2 will be active when the Capability Exchange feature has been completed. Release 2 will continually evolve as new features are added. An individual feature will be considered complete and available for adoption when the associated test has been balloted and approved.

Slide 15
What is addressed in the Release 2 (1 of 3)

**Capability Exchange**
- Ability to exchange list of features supported.
- Mandatory to claim WInnForum Release 2 Compliance

**Enhanced CBSD Group Handling**
- Includes extensible grouping parameters and single frequency groups
- Includes Distributed Antenna Systems

**PAL Secondary Market Support**
- Enhanced support for PAL leasing

**PAL Operations**
- Includes PAL Coexistence and PAL Channel Assignment

**Support for 1D and 2D Antenna Patterns**

**Indoor Penetration Loss**
- Application of indoor penetration measurements to improve coexistence modeling
Enhanced CPE-CBSD Support
  • New parameter flagging BTS or CPE operation to SAS
  • Support for changes to IAP

Enhanced Propagation Models
  • New propagation models to better support coexistence

GAA Coexistence Support
  • SAS to SAS information exchange to facilitate improved GAA coexistence

Flexible Grant Request

Grant Update
  • Existing Grant may be updated without relinquishing the Grant

New Response Codes

Registration Enhancements
  • CPI Operations and CPI Training
WINNF-SSC-0009 Grouping Parameters Registration Policy
WINNF-SSC-0010 Registered Grouping Parameters
• Companies must agree to Policies and Procedures for Self Testing balloted and approved by the WInnForum members to claim “conformance” with WInnForum Standards for that feature, including:
  • Agreeing to follow the test specifications defined by the WInnForum CBRS Test and Certification work group for the mandatory Release 2 procedures and for supported Release 2 optional features
  • Agreeing to use the WInnForum test harness developed by the WInnForum CBRS Test and Certification work group for supported features
  • Agree to submit, on company letter head, a signed letter to the WInnForum summarizing the testing for each feature, including the output of the test harness, if applicable, and indicating that all tests were passed

• WInnForum will maintain a public website detailing which products are compliant with which feature
• Will start with Feature-by-Feature case, but may later move to feature bundle profiles
• interoperability testing in addition to the self Testing
  • Not required as part of certification
  • Entities might require that as part of their business agreement